

may use other display devices, such as simplified LCD, LED, fluorescent element, plasma screen, or the like. The results and information displayed includes, but is not limited to, trending information of the characteristic (e.g., rate of change of glucose), graphs of historical data, average characteristic levels (e.g., glucose), or the like. Alternative embodiments include the ability to scroll through the data. The display **2208** may also be used with the keypad **2202** on the characteristic monitor **2200** to program or update data in the characteristic monitor **2200**. In addition, the calibrated data using results from the characteristic meter **2300** can be displayed to provide a user with updated trend and glucose level data. This may also be used to update and show differences between the newly calibrated (or additional calibration) data and the data as it was prior to the new calibration (or additional calibration).

[**0084**] In other embodiments, if multiple characteristic sensors are used, the individual data for each characteristic sensor may be stored and displayed to show a comparison and an average between the two characteristic sensors.

[**0085**] It is noted that a typical user can have somewhat diminished visual and tactile abilities due to complications from diabetes or other conditions. Thus, the display **2208** and keypad **2202** are preferably configured and adapted to the needs of a user with diminished visual and tactile abilities. In alternative embodiments, the data, analyte level value, confirmation of information, or the like can be conveyed to the user by audio signals, such as beeps, speech or the like, or vibrations. Still further embodiments may use a touch screen instead of (or in some cases addition to) the keypad **2202** to facilitate water proofing and to minimize changes in the characteristic monitor **2200** hardware to accommodate improvements or upgrades. Additional embodiments of the present invention may include a vibrator alarm (or optional indicator such as an L.E.D.) in either, or both, the telemetered characteristic monitor transmitter **2100** and the characteristic monitor **2200** to provide a tactile (vibration) alarm to the user, such as sensor set **2150** malfunction, improper connection, low battery, missed message, bad data, transmitter interference, or the like. The use of a vibration alarm provides additional reminders to an audio alarm, which could be important to someone suffering an acute reaction, or where it is desirable to have non-audio alarms to preserve and conceal the presence of the characteristic monitor system **2010**.

[**0086**] As shown in **FIG. 33**, further embodiments of the characteristic monitor **2200** may be used with a telemetered characteristic monitor transmitter **2100** coupled to a sensor set **2150** and an infusion pump **1010** connected to an infusion set **1038**. In this embodiment, the characteristic monitor **2200** is also used to program and obtain data from the infusion pump **1010**, or the like. This further reduces the amount of equipment, the user must have, since the characteristic monitor **2200** already includes a characteristic meter **2300** that will be required for calibration of the data from the telemetered characteristic monitor transmitter **2100**. Thus, the characteristic monitor **2200** can coordinate the sensor data and meter data with the data from the infusion pump **1010**, or update the delivery parameters of the infusion pump **1010**. The characteristic monitor **2200** may also be used to update and program the telemetered characteristic monitor transmitter **2100**, if the transmitter **2100** includes a receiver for remote programming, calibra-

tion or data receipt. Thus, the user may need only a single device—the characteristic monitor **2200** that will receive data from a sensor set **2150**, perform discrete tests of an analyte with the characteristic meter **2300**, program and control an infusion pump **1010**, and operate to download data or upload programming instructions to a computer, communication station, or the like.

[**0087**] As discussed, the characteristic monitor **2200** can also be used to store data obtained from the sensor set **2150** and then provide it to either an infusion pump **1010**, computer or the like for analysis. In further embodiments, the characteristic monitor **2200** can include a modem, or the like, to transfer data to and from a healthcare professional. Further embodiments, can receive updated programming or instructions via a modem connection. In addition, a relay or repeater **2004** may be used with a telemetered characteristic monitor transmitter **2100** and a characteristic monitor **2200** to increase the distance that the telemetered characteristic monitor transmitter **2100** can be used with the characteristic monitor **2200**, as shown in **FIG. 28**. For example, the relay **2004** could be used to provide information to parents of children using the telemetered characteristic monitor transmitter **2100** and the sensor set **2150** from a distance. The information could be used when children are in another room during sleep or doing activities in a location remote from the parents. In further embodiments, the relay **2004** can include the capability to sound an alarm. In addition, the relay **2004** may be capable of providing data from sensor set **2150** and telemetered characteristic monitor transmitter **2100** to a remotely located individual via a modem connected to the relay **2004** for display on a monitor, pager or the like. In alternative embodiments, the data from the characteristic monitor **2200** and sensor set **2150** may also be downloaded through a communication station **2008** (or alternatively, through a characteristic monitor **2200**, other data transfer device, or the like) to a remotely located computer **2006** such as a PC, lap top, or the like, over communication lines, by modem or wireless connection, as shown in **FIG. 29**. Also, some embodiments may omit the communication station **2008** and use a direct modem or wireless connection to the computer **2006**. In further alternatives, either the characteristic monitor **2200** or the telemetered characteristic monitor transmitter **2100** may transmit an alarm to a remotely located device, such as a communication-station, modem or the like to summon help. In addition, further embodiments of the characteristic monitor **2200** may include the capability for simultaneous monitoring of multiple sensors. Data transmission may be to other devices or include the capability to receive data or instructions from other medical devices. Preferred embodiments, as shown in **FIGS. 31 and 33**, use wireless RF frequencies; however, alternative embodiments may utilize IR, optical, ultrasonic, audible frequencies or the like. Further embodiments may also use a wired connection, as shown in **FIG. 32**.

[**0088**] Preferably, the characteristic monitor system **2010** combines the characteristic monitor **2200** and characteristic meter **2300** into a single device, but avoids an actual wired connection to the sensor set **2150** by using a telemetered characteristic monitor transmitter **2100**. By separating the characteristic monitor system **2010** electronics into two separate devices; a telemetered characteristic monitor transmitter **2100** (which attaches to the sensor set **2150**) and a characteristic monitor **2200**, several advantages are realized.